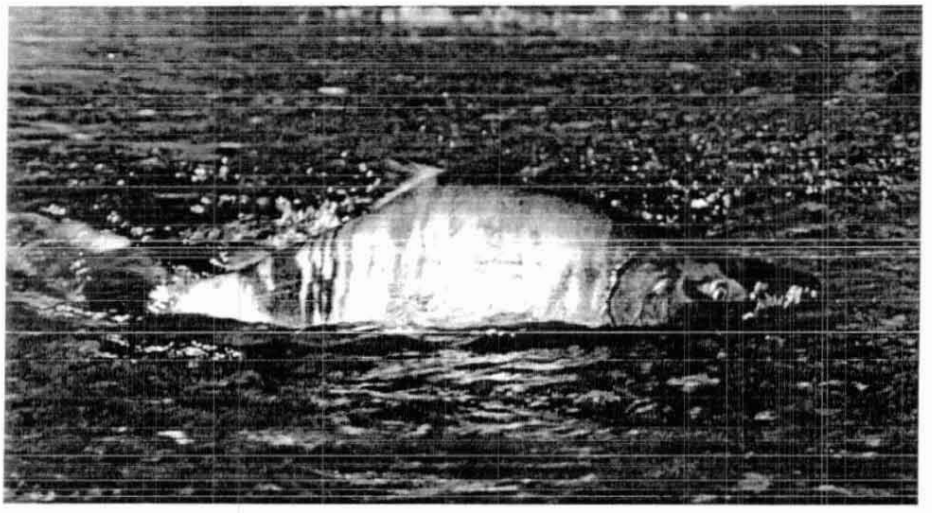
KOBUK RIVER TEST FISHING PROJECT, 2001

By

Tom Kohler



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ABSTRACT

This was the ninth consecutive year a drift gillnet test fishing project operated in the lower Kobuk River. Management of the Kotzebue District commercial salmon fishery, particularly during the month of July, is dependent primarily on comparing current year commercial fishing period and cumulative season catch statistics to those of previous years. The driftnet test fishing project was initiated because of the need for an inseason index of run timing and abundance for Kobuk River chum salmon *Oncorhynchus keta* stocks, which largely support the first portion of the salmon migration into the Kotzebue District. Drifting began on 7 July and continued through 13 August. A cumulative chum salmon CPUE of 1,574.72 was produced by 2,035 chum salmon caught in a total of 232 drifts (116 drift time periods). The CPUE was the second highest since the project began in 1993. The seasonal age composition was 1.9% age-0.2, 36.9% age-0.3, 58.6% age-0.4, and 2.6% age-0.5. The sex composition of the Kotzebue commercial catch and the Kobuk River test net catch were both composed of 58% females and 42% males.

KEY WORDS: chum salmon, test fishing, Kotzebue District, Oncorhynchus, Kobuk River, catch per unit effort

INTRODUCTION

The Kobuk River originates on the south side of the Brooks Range in the Arrigetch Mountains inside the Gates of the Arctic National Park. The river flows roughly 800-river km. west where it terminates at Hotham Inlet. The lower two-thirds of the river is stained by tannin primarily from the Pah River, an upper river tributary. The five Kobuk River villages of Norvik, Kiana, Ambler, Shungnak, and Kobuk depend on chum salmon *Oncorhynchus keta* for subsistence use. Residents of Kotzebue also depend on Kobuk River chum salmon as a subsistence resource. The Kobuk River stock is thought to support up to 60% of the commercial harvest of chum salmon in the Kotzebue District.

This was the ninth consecutive year a drift gillnet test fishing project operated in the lower Kobuk River (Lingnau 1993, Lingnau 1994; Lingnau 1995; Lingnau 1996; Lingnau 1997; Kohler 2000a, Kohler 2000b; Kohler 2001). Salmon are less likely to avoid the test fishing net because of the Kobuk River's tannic stain, than in clear water systems. The only previous salmon project in the Kobuk River drainage was a counting tower site on the Squirrel River, which was too distant to provide timely information for fisheries management. This report presents the results of the ninth year of the Kobuk River drift test-fishing project.

Management of the Kotzebue District commercial salmon fishery, particularly during the month of July, is dependent primarily on comparing commercial fishing period and cumulative season catch statistics to those of previous years. Changes in market demand in recent years render these comparisons no longer reliable. The drift test fishing project was initiated because of the need for an inseason index of run timing and abundance for Kobuk River chum salmon stocks, which largely support the first portion of the salmon migration into the Kotzebue District. While test fishing is a relatively low cost approach, it can also be susceptible to inter-annual variability in catch rates. This variability typically requires the data be interpreted in a somewhat qualitative way as an abundance index if calibration is not possible between years. The objectives of the test fishing project for 2001 were:

1. Evaluate chum salmon abundance migrating into the Kobuk River drainage using a comparison of systematic drift gillnet catches.
2. Assess, in a qualitative way, the impact of the Kotzebue District commercial salmon fishery on chum salmon abundance in the lower Kobuk River for fisheries management purposes.
3. Describe the migratory timing for chum salmon in the lower Kobuk River.
4. Sample for age, sex and length (ASL).

METHODS

Site Description

The inriver drift gillnet test fishery site is approximately 110 river km from the eastern boundary of the commercial salmon fishing district (Figure 1). This location is the furthest downstream site where the river runs through a single channel, and is below all tributaries that support spawning chum salmon. The test fishing site was selected because of its desirable stream characteristics. The site consists of roughly a 1.6 km river section located approximately 5 km downstream from Kiana. The width of the river was approximately 300 m. and was divided into two sites (Figure 2). Site N is the north side of the river (right bank facing downriver), which is the cut bank side of the river with the swiftest current. Site S is located on the south side of the river (left bank), and is located downstream from a major sandbar that has a gradual gradient and the slowest current. A bottom profile at the test fish site in 1997 revealed a near uniform bottom with a maximum depth of 6 m. The deepest portion of the river was located in the first quartile from the right (North) bank.

Test Fishing

Fishing was scheduled to sample salmon passage during three different periods each day at each of the two sites; morning (0800h), mid-day (1500h), and late evening (2200h). A two-person crew conducted the drifts.

All test fishing drifts were approximately 20 minutes duration, using a 50-fathom gillnet. The net was composed of 6 in (15.2 cm) stretched mesh multifilament webbing, 40 meshes deep, and hung at a ratio of 2:1. Netting was conducted from a 20-foot boat, powered by an 85 hp outboard motor. If catch rates were high, fishing time was reduced to control mortality. Mortalities were primarily given to village elders but some were given to other individuals for subsistence purposes. The availability of chum salmon (mortalities) was announced over a CB radio.

Age-sex-length (ASL) data were collected from up to 80 chum salmon per day. Age was determined from scales removed from the left side of the fish in an area above the lateral line crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. Scales were mounted on gum cards and impressions were later made in cellulose acetate cards with a scale press. The scales were read with the aid of a microfiche reader and ages were reported in European notation (the first digit refers to the freshwater age and does not include the year spent in the gravel; the second digit refers to the ocean age) (Koo 1962). Sex was determined by examining external characteristics, such as: snout, vent, and body symmetry. Fish length was measured to the nearest five millimeters from mid-eye to fork-of-tail (fork length, FL).

Standardized Catches

Actual catches were converted to catch per unit of effort (CPUE) by proportioning fishing time and the length of net used. Each CPUE index was standardized as the number of fish that would have

been caught if 100 fathoms of net had been fished for 60 minutes. The index (I) was calculated as follows:

$$I = \frac{6{,}000\,(c)}{(l)(t)}$$

Where: c = number of chum salmon caught
l = length of net in fathoms
t = mean fishing time in minutes

Mean fishing time (t) was defined as the amount of time the entire net was fishing plus half the time it took to deploy and retrieve the net. Mean daily drift CPUE indices were calculated using the sum of the total time fished and total fish caught for each day. The mean daily indices were summed to produce a total seasonal CPUE indice for the period of data collection. Cumulative proportions of seasonal total test fish CPUE indices were also calculated.

Catch rates for each time period and site were determined by using the fishing time and number of fish caught for those specific time periods and sites. Seasonal abundance by site and time period was indexed by summing CPUE indices for each of the daily sites and time periods. Temporal distribution was depicted as a percent, calculated by dividing each time period total by the total CPUE indices. Spatial distribution was described as a percent by dividing each site's seasonal total CPUE by the total of both site's CPUE indices. Temporal and spatial distributions are described as a percent since the number of drifts made at each site and the amount of time fished varied yearly (Lingnau 1998). The test fishing methods for the Kobuk River project were the same as they had been in the previous eight years. The test fishing gear was intended to match the gear typically used in the commercial fishery. In most years, one day of test fishing is missed because of a regularly scheduled day off. In 2001 managers decided that since the test fishery was the only indication of escapement in the Kotzebue District fishery it would be conducted seven days a week. No drifts were missed because of mechanical problems or weather.

RESULTS

Drift fishing began on 5 July and continued through 13 August 2001. Calculated CPUE indices for each drift and site are reported in Table 1. A total of 2,035 chum salmon caught in 232 drifts (116 drift time periods) produced a cumulative chum salmon CPUE of 1,574.72 (Tables 1 and 2). Peak catch (168) and CPUE (108.97) occurred on 22 July, which was 6.9% of the seasonal CPUE index (Table 3). Totals of 41.1%, 28.8%, and 30.1% of the seasonal CPUE indices were caught at 0800, 1500, and 2200 hours, respectively (Table 4). Of the total seasonal CPUE indices, 30.1% were caught at the N site, and 69.9% at the S site (Table 5). Seasonal test fishing data for 1993-2001 are presented in Tables 2, 3, 5 and 6. Figure 3 also shows test fishing cumulative CPUE by day for 1993-2001.

A total of 930 chum salmon scales were aged from the test net samples. The sample (scales) size was large enough to stratify the age and sex composition, and therefore was stratified into three periods, 6-21 July, 22-31 July, and 1-13 August (Table 7). The seasonal age composition was 1.9% age-0.2, 36.9% age-0.3, 58.6% age-0.4, and 2.6% age-0.5 (Table 7). The ASL composition of the 2001 Kotzebue commercial, and the Noatak and Kobuk Rivers drift test fish catches are shown in Table 8 for comparison. The sex composition of the Kotzebue commercial catch and the Kobuk River test net catch were both composed of 58% females and 42% males. The Noatak River sample was composed of 71.2% females and 28.8% males. Comparisons of mean lengths by age for all three sample areas, indicated that for both males and females sizes were similar. Chum salmon samples were caught with similar mesh size gear; Kobuk and Noatak rivers were from 6 in mesh drift gillnet while Kotzebue District commercial gear is typically 5-7/8 or 6 in mesh set gillnet.

The generated test fishing CPUE indices (number of salmon caught) can be influenced considerably by normal commercial fishing activity in Kotzebue Sound, and also by the number of drifts conducted and their timing when compared to commercial periods. In addition, local salmon migration patterns can be influenced by weather conditions. For these reasons, the accuracy of such estimates may not be reliable, and therefore no interpolations were made for missing data points.

DISCUSSION

The Kobuk River test fishing project was successful again in 2001, and supplied the only indication of escapement in the Kotzebue district during the commercial season. Lack of personnel in Kotzebue precluded additional studies. During low water periods tannic staining in the river concealed the gillnet and inhibited net avoidance by migrating salmon, contributing to stable catch efficiencies throughout the season. The relatively constant fish catch throughout the run duration allowed for comparability within and between years.

This year's chum salmon passage by time period was highest during the first drift period (0800 h). In comparison to historical catch information, in most years, very little difference in salmon passage has been noted during different periods during the day, and catch rates by site were also consistent. In all but one year, roughly 70% of the salmon CPUE occurred at the S site. This one anomalous year (1994), was attributed to a 50-year flood event.

The ASL ratio data obtained from both the inriver test fisheries and the Kotzebue Sound commercial fishery are possibly biased by gear selectivity, and may not represent the total population. The gillnet gear employed in both fisheries (commercial and test netting) is manufactured of extremely heavy twine with very little stretch and therefore is size selective. In a year such as 2001, with a higher percent return of five-year-old chum salmon, this could have resulted in a selective catch of the smaller females.

This year's peak catches occurred between 19 July and 6 August. Fluctuations in the test fishery data are caused by commercial fishery openings, and in 2001 this indicated the inriver migration timing to the test fishery sites was 5 days at the beginning of the run and 4 days at the end. Previous years' information from local residents and the department indicate the migration time

to the sites is usually 5 to 6 days. Test fish catches in 2001 indicated that the Kobuk River chum salmon run was strong and approximately five days earlier than the average since 1993 (Figure 3).

The test fishing crew interviewed local subsistence fishers throughout the season, and catch rates from the test fishery seemed to track with subsistence catches. The test fishery is most likely catching mixed stocks of fish, while Kiana residents are thought to harvest predominantly Squirrel River stocks. Because the Kobuk River test fishing project provided fish to the community of Kiana, the pressure from subsistence harvests on Squirrel River stocks was probably reduced.

The project was operated as funded and scheduled. The six-week duration was thought to cover most of the migration. However, catches at the end of test fishing indicated the last portion of the run was missed. Test fishing on the Kobuk River at the current drift gillnet site near Kiana is feasible and provides management staff with usable escapement indexing information in a cost effective manner. This project was used this year as in past years, and will probably be used in the future as a management tool to index chum salmon escapement and run timing into the Kobuk River drainage.

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Table 1. Kobuk River chum salmon drift test fish CPUE by day, drift and site, 2001. [a]

Date	CPUE by Drift [b] #1	#2	#3	CPUE by Site [c] N	S	Daily CPUE	Cum.. CPUE
5-Jul			0.00	0.00	0.00		0.00
6-Jul	2.58	2.58	2.61	1.74	3.43	2.59	2.59
7-Jul	2.38	0.00	4.80	1.69	3.14	2.44	5.03
8-Jul	2.47	0.00	0.00	1.68	0.00	0.83	5.86
9-Jul	4.85	19.20	7.83	1.70	19.20	10.72	16.58
10-Jul	2.58	2.58	19.20	0.00	16.33	8.39	24.97
11-Jul	19.01	27.96	12.63	6.91	31.50	20.07	45.04
12-Jul	12.50	15.16	10.21	5.18	19.73	12.63	57.67
13-Jul	29.09	2.58	19.39	1.74	31.37	17.32	74.99
14-Jul	67.03	5.16	57.86	3.48	78.20	45.57	120.56
15-Jul	45.71	45.00	24.49	25.43	51.22	38.86	159.42
16-Jul	48.00	20.43	28.51	21.00	20.00	32.80	192.22
17-Jul	84.83	42.77	10.32	69.00	86.00	48.77	240.99
18-Jul	42.06	28.24	40.75	22.29	49.45	36.98	277.97
19-Jul	105.52	72.21	12.90	12.17	108.26	67.08	345.05
20-Jul	37.78	0.00	36.92	6.91	42.18	26.05	371.10
21-Jul	21.60	15.48	47.59	25.00	13.00	29.51	400.61
22-Jul	38.79	127.38	141.28	63.53	147.60	108.97	509.58
23-Jul	42.00	51.00	59.26	30.00	68.84	50.79	560.37
7-Jan	86.00	33.33	44.54	55.25	62.40	58.96	619.33
25-Jul	67.50	66.00	106.11	73.58	87.76	80.59	699.92
26-Jul	105.23	88.00	86.60	51.85	131.03	94.06	793.98
27-Jul	125.45	102.13	38.05	46.29	135.71	95.06	889.04
28-Jul	74.02	57.27	37.40	52.73	63.43	58.24	947.28
29-Jul	73.04	51.89	31.20	39.49	66.60	54.33	1,001.61
30-Jul	81.23	7.50	0.00	19.86	48.28	35.36	1,036.97
31-Jul	61.59	25.88	21.82	35.49	41.60	38.63	1,075.60
1-Aug	78.58	49.90	54.34	18.86	94.67	61.50	1,137.10
2-Aug	44.27	2.53	0.00	16.67	16.44	16.55	1,153.65
3-Aug	84.83	20.43	17.87	13.71	70.24	44.21	1,197.86
4-Aug	56.22	15.32	15.65	20.57	39.75	30.71	1,228.57
5-Aug	45.41	0.00	76.55	10.29	69.72	43.64	1,272.21
6-Aug	27.70	35.64	26.67	18.46	40.78	30.00	1,302.21
7-Aug	25.00	45.71	5.22	22.13	30.00	26.31	1,328.52
8-Aug	23.48	42.48	35.29	15.21	50.91	34.40	1,362.92
9-Aug	45.71	15.16	5.22	15.43	30.00	23.01	1,385.93
10-Aug	51.89	67.03	45.28	30.21	73.95	54.88	1,440.81
11-Aug	52.84	75.00	89.77	48.31	93.33	73.64	1,514.45
12-Aug	33.27	17.87	83.48	8.70	78.14	47.23	1,561.68
13-Aug	13.04			10.43	15.65	13.04	1,574.72

[a] Catch per unit effort is calculated in catch/100 fathoms/hour

[b] Drift 1 begins at 0800, Drift 2 at 1500, Drift 3 at 2200 Hours .

[c] Site N is the North Bank (right bank), Site S is the South Bank (left bank).

Table 2. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE, 1993-2001.

	1993		1994		1995		1996		1997		1998		1999		2000		2001		Cumulative CPUE
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	1993-2000
05-Jul																	0	0	
06-Jul																	2.59	2.59	
07-Jul															1.28	1.28	2.44	5.03	0.16
08-Jul															0.83	2.11	0.83	5.86	0.26
09-Jul							12.77	12.77	5.85	5.85					0	2.11	10.72	16.58	2.59
10-Jul							15.00	27.77	0.00	5.85	5.22	5.22			2.5	4.61	8.39	24.97	5.43
11-Jul							98.38	126.15	5.31	11.16	0.85	6.07	0.00	0.00	3.44	8.05	20.07	45.04	18.93
12-Jul	11.18	11.18			0.00	0.00	45.54	171.69	7.19	18.35	0	6.07	0.00	0.00	3.45	11.50	12.63	57.67	27.35
13-Jul	14.22	25.40	0.00	0.00	0.93	0.93	74.29	245.98	a	18.35	15.89	21.96	0.00	0.00	2.54	14.04	17.32	74.99	40.83
14-Jul	20.57	45.97	2.68	2.68	2.80	3.73	a	245.98	6.25	24.60	7.53	29.49	0.00	0.00	8.57	22.61	45.57	120.56	46.88
15-Jul	35.08	81.05	2.58	5.26	2.77	6.50	83.75	329.73	3.65	28.25	14.07	43.56	0.00	0.00	0.87	23.48	38.86	159.42	64.73
16-Jul	13.19	94.24	11.35	16.61	a	6.50	71.35	401.08	14.28	42.53	17.33	60.89	0.00	0.00	3.38	26.86	32.80	192.22	81.09
17-Jul	17.27	111.51	a	16.61	0.00	6.50	55.49	456.57	15.17	57.70	5.07	65.96	4.26	4.26	12.77	39.63	48.77	240.99	94.84
18-Jul	a	111.51	7.16	23.77	1.81	8.31	89.86	546.43	16.12	73.82	9.02	74.98	8.48	12.74	3.58	43.21	36.98	277.97	111.85
19-Jul	10.71	122.22	12.40	36.17	9.89	18.20	54.74	601.17	17.98	91.80		74.98	5.89	18.63	19.51	62.72	67.08	345.05	128.24
20-Jul	2.76	124.98	3.65	39.82	16.30	34.50	63.70	664.87	a	91.80	18.66	93.64	5.11	23.74	14.57	77.29	26.05	371.10	143.83
21-Jul	3.20	128.18	7.30	47.12	38.54	73.04	52.12	716.99	18.53	110.33	11.87	105.51	23.75	47.49	27.69	104.98	29.51	400.61	166.71
22-Jul	5.52	133.70	3.56	50.68	21.18	94.22	50.97	767.96	13.28	123.61	0.00	105.51	11.91	59.40	41.00	145.98	108.97	509.58	185.13
23-Jul	27.15	160.85	16.49	67.17	50.58	144.80	91.36	859.32	10.79	134.40	29.58	135.09	6.09	65.49	16.29	162.27	50.79	560.37	216.17
24-Jul	9.06	169.91	a	67.17	28.46	173.26	91.89	951.21	22.86	157.26	27.33	162.42	24.95	90.44	14.62	176.89	58.96	619.33	243.57
25-Jul	a	169.91	14.38	81.55	40.16	213.42	76.80	1,028.01	21.57	178.83	24.68	187.10	28.73	119.17	22.98	199.87	80.59	699.92	272.23
26-Jul	15.22	185.13	47.65	129.20	35.15	248.57	55.68	1,083.69	14.66	193.49		187.10	39.72	158.89	40.28	240.15	94.06	793.98	303.28
27-Jul	8.06	193.19	40.66	169.86	63.94	312.51	29.79	1,113.48	18.46	211.95	23.91	211.01	80.39	239.28	41.52	281.67	95.06	889.04	341.62
28-Jul	16.36	209.55	57.83	227.69	62.49	375.00	49.06	1,162.54	30.53	242.48	51.91	262.92		239.28	62.34	344.01	58.24	947.28	382.93
29-Jul	0.93	210.48	33.62	261.31	46.11	421.11	70.13	1,232.67	28.13	270.61	34.16	297.08	55.00	294.28	96.00	440.01	54.33	1,001.61	428.44
30-Jul	0.92	211.40	69.21	330.52	57.86	478.97	35.29	1,267.96	22.33	292.94	24.59	321.67	49.66	343.94	88.89	528.90	35.36	1,036.97	472.04
31-Jul	12.58	223.98	a	330.52	29.89	508.86	82.27	1,350.23	32.57	325.51	15.69	337.36	160.53	504.47	85.87	614.77	38.63	1,075.60	524.46
01-Aug	a	223.98	82.16	412.68	72.91	581.77	167.7	1,517.90	41.41	366.92	25.44	362.80	145.02	649.49	101.16	715.93	61.50	1,137.10	603.93
02-Aug	6.74	230.72	65.12	477.80	48.71	630.48	62.02	1,579.92	22.41	389.33		362.80	41.67	691.16	64.37	780.30	16.55	1,153.65	642.81
03-Aug	54.49	285.21	71.79	549.59	48.40	678.88	48.7	1,628.62	35.21	424.54	26.67	389.47	33.19	724.35	44.32	824.62	44.21	1,197.86	688.16
04-Aug	44.23	329.44	108.98	658.57	53.00	731.88	65.93	1,694.55	26.67	451.21	42.35	431.82	74.23	798.58	77.14	901.76	30.71	1,228.57	749.73
05-Aug	89.30	418.74	59.74	718.31	49.95	781.83	60.33	1,754.88	24.47	475.68	8.57	440.39	108.04	906.62	75.67	977.43	43.64	1,272.21	809.24
06-Aug	18.60	437.34	102.56	820.87	a	781.83	80.47	1,835.35	42.25	517.93	6.00	446.39	82.79	989.41	38.92	1,016.35	30.00	1,302.21	855.68
07-Aug	20.52	457.86	a	820.87	46.39	828.22	90.99	1,926.34	36.00	553.93	5.11	451.50	82.73	1,072.14	37.50	1,053.85	26.31	1,328.52	895.59
08-Aug	a	457.86	62.75	883.62	44.02	872.24	146.9	2,073.28	45.07	599.00	16.40	467.90		1,072.14	93.37	1,147.22	34.40	1,362.92	946.66
09-Aug	1.84	459.70	96.86	980.48	68.22	940.46	106.1	2,179.39	55.14	654.14	17.20	485.10	55.58	1,127.72	81.50	1,228.72	23.01	1,385.93	1006.96
10-Aug	12.63	472.33	45.83	1,026.31	56.33	996.79	56.95	2,236.34	a	654.14	9.46	494.56	44.73	1,172.45	113.87	1,342.59	54.88	1,440.81	1049.44

(Continued)

Table 2. (Page 2 of 2)

	1993		1994		1995		1996		1997		1998		1999		2000		2001		Cumulative CPUE
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum	Daily	Cum.		Cum.	1993-2000
11-Aug	18.11	490.44	57.02	1,083.33	37.95	1,034.74	a	2,236.34	43.45	697.59	10.29	504.85	58.13	1,230.58	50.57	1,393.16	73.64	1,514.45	1083.88
12-Aug	3.74	494.18	90.54	1,173.67	63.92	1,098.66	72.29	2,308.63	37.36	734.95	19.44	524.29	48.5	1,279.08	24.86	1,418.02	47.23	1,561.68	1126.96
13-Aug			11.36	1,185.23	a	1,098.66	114.6	2,423.26	45.93	780.88	10.21	534.50	78.37	1,357.45	14.57	1,432.59	13.04	1,574.72	1101.57
14-Aug			a	1,185.23	29.35	1,128.01	158.1	2,581.39	16.01	796.89	3.85	538.35			7.83	1,440.42		1,574.72	1190.24
15-Aug			5.13	1,190.36	25.26	1,153.27					0	538.35							
16-Aug			16.23	1,206.59	35.04	1,188.31													
17-Aug			0.00	1,206.59															
18-Aug			0.00	1,206.59															
19-Aug			3.12	1,209.71															
20-Aug			0.00	1,209.71															
21-Aug			a	1,209.71															
22-Aug			0.00	1,209.71															
23-Aug			0.00	1,209.71															
24-Aug			0.00	1,209.71															
25-Aug			0.91	1,210.62															
26-Aug			5.56	1,216.18															
27-Aug			1.86	1,218.04															
28-Aug			0.93	1,218.97															
29-Aug			0.00	1,218.97															
30-Aug			0.00	1,218.97															

a Regular day off.

Table 3. Kobuk River chum salmon drift test fish daily and cumulative CPUE proportions, 1993-2001.

	1993		1994		1995		1996		1997		1998		1999		2000		2001	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
05-Jul																	0.002	0.00
06-Jul															0.001	0.00	0.002	0.00
07-Jul															0.001	0.00	0.001	0.00
08-Jul							0.005	0.005	0.007	0.007					0.000	0.00	0.007	0.01
09-Jul							0.006	0.011	0.000	0.007	0.010	0.01			0.002	0.00	0.005	0.02
10-Jul							0.038	0.049	0.007	0.014	0.002	0.011	0.000	0.00	0.002	0.01	0.013	0.03
11-Jul							0.018	0.067	0.009	0.023		0.011	0.000	0.00	0.002	0.01	0.008	0.04
12-Jul	0.023	0.023			0.000	0.000	0.029	0.095	0.000	0.023	0.030	0.041	0.000	0.00	0.002	0.01	0.011	0.05
13-Jul	0.029	0.051	0.000	0.000	0.001	0.001		0.095	0.008	0.031	0.014	0.055	0.000	0.00	0.006	0.02	0.029	0.08
14-Jul	0.042	0.093	0.002	0.002	0.002	0.003	0.032	0.128	0.005	0.035	0.026	0.081	0.000	0.00	0.001	0.02	0.025	0.10
15-Jul	0.071	0.164	0.002	0.004	0.002	0.005	0.028	0.155	0.018	0.053	0.032	0.113	0.000	0.00	0.002	0.02	0.021	0.12
16-Jul	0.027	0.191	0.009	0.014	*	0.005	0.021	0.177	0.019	0.072	0.009	0.122	0.003	0.00	0.009	0.03	0.031	0.15
17-Jul	0.035	0.226	*	0.014	0.000	0.005	0.035	0.212	0.020	0.093	0.017	0.139	0.006	0.01	0.002	0.03	0.023	0.18
18-Jul	*	0.226	0.006	0.020	0.002	0.007	0.021	0.233	0.023	0.115		0.139	0.004	0.01	0.013	0.04	0.043	0.22
19-Jul	0.022	0.247	0.010	0.030	0.008	0.015	0.025	0.258	0.000	0.115	0.035	0.174	0.004	0.02	0.010	0.05	0.017	0.24
20-Jul	0.006	0.253	0.003	0.033	0.014	0.029	0.020	0.278	0.023	0.138	0.022	0.196	0.017	0.03	0.019	0.07	0.019	0.25
21-Jul	0.006	0.259	0.006	0.039	0.032	0.061	0.020	0.297	0.017	0.155	0.000	0.196	0.009	0.04	0.028	0.10	0.069	0.32
22-Jul	0.011	0.271	0.003	0.042	0.018	0.079	0.035	0.333	0.014	0.169	0.055	0.251	0.004	0.05	0.011	0.11	0.032	0.36
23-Jul	0.055	0.325	0.014	0.055	0.043	0.122	0.036	0.368	0.029	0.197	0.051	0.301	0.018	0.07	0.010	0.12	0.037	0.39
24-Jul	0.018	0.344	*	0.055	0.024	0.146	0.030	0.398	0.027	0.224	0.046	0.347	0.021	0.09	0.016	0.13	0.051	0.44
25-Jul	*	0.344	0.012	0.067	0.034	0.180	0.022	0.420	0.018	0.243		0.347	0.029	0.12	0.027	0.16	0.060	0.50
26-Jul	0.031	0.375	0.039	0.106	0.030	0.209	0.012	0.431	0.023	0.266	0.044	0.391	0.059	0.18	0.028	0.19	0.060	0.56
27-Jul	0.016	0.391	0.033	0.139	0.054	0.263	0.019	0.450	0.038	0.304	0.096	0.488		0.18	0.042	0.23	0.037	0.60
28-Jul	0.033	0.424	0.047	0.187	0.053	0.316	0.027	0.478	0.035	0.340	0.063	0.551	0.041	0.22	0.065	0.30	0.035	0.64
29-Jul	0.002	0.426	0.028	0.214	0.039	0.354	0.014	0.491	0.028	0.368	0.046	0.597	0.037	0.26	0.093	0.39	0.022	0.66
30-Jul	0.002	0.428	0.057	0.271	0.049	0.403	0.032	0.523	0.041	0.408	0.029	0.626	0.118	0.38	0.058	0.45	0.025	0.68
31-Jul	0.025	0.453	*	0.271	0.025	0.428	0.065	0.588	0.052	0.460	0.047	0.673	0.107	0.48	0.068	0.52	0.039	0.72
01-Aug	*	0.453	0.067	0.339	0.061	0.490	0.024	0.612	0.028	0.489		0.673	0.031	0.51	0.043	0.55	0.011	0.73
02-Aug	0.014	0.467	0.053	0.392	0.041	0.531	0.019	0.631	0.044	0.533	0.050	0.723	0.024	0.54	0.030	0.59	0.028	0.76
03-Aug	0.110	0.577	0.059	0.451	0.041	0.571	0.026	0.656	0.033	0.566	0.079	0.801	0.055	0.59	0.052	0.64	0.020	0.78
04-Aug	0.090	0.667	0.089	0.540	0.045	0.616	0.023	0.680	0.031	0.597	0.016	0.817	0.080	0.67	0.045	0.69	0.028	0.81
05-Aug	0.181	0.847	0.049	0.589	0.042	0.658	0.031	0.711	0.053	0.650	0.011	0.828	0.061	0.73	0.026	0.71	0.019	0.83
06-Aug	0.038	0.885	0.084	0.673	*	0.658	0.035	0.746	0.045	0.695	0.009	0.838	0.061	0.79	0.025	0.74	0.017	0.84
07-Aug	0.042	0.927	*	0.673	0.039	0.697	0.057	0.803	0.057	0.752	0.030	0.868		0.79	0.063	0.80	0.022	0.87
08-Aug	*	0.927	0.051	0.725	0.037	0.734	0.041	0.844	0.069	0.821	0.032	0.900	0.041	0.83	0.055	0.85	0.015	0.88
09-Aug	0.004	0.930	0.079	0.804	0.057	0.791	0.022	0.866	0.000	0.821	0.018	0.918	0.033	0.86	0.077	0.93	0.035	0.91
10-Aug	0.026	0.956	0.038	0.842	0.047	0.839	*	0.867	0.055	0.875	0.019	0.937	0.043	0.91	0.034	0.97	0.047	0.96
11-Aug	0.037	0.992	0.047	0.889	0.032	0.871	0.028	0.895	0.047	0.922	0.036	0.973	0.036	0.94	0.017	0.98	0.030	0.99
12-Aug	0.008	1.000	0.074	0.963	0.054	0.925	0.044	0.939	0.058	0.980	0.019	0.992	0.058	1.00	0.010	0.99	0.008	1.00
13-Aug			0.009	0.972	*	0.925	0.061	1.000	0.020	1.000	0.007	0.999			0.005	1.00		
14-Aug			*	0.972	0.025	0.949					0.000	0.999						
15-Aug			0.004	0.977	0.021	0.971												
16-Aug			0.013	0.990	0.029	1.000												
17-Aug			0.000	0.990														
18-Aug			0.000	0.990														
19-Aug			0.003	0.992														
20-Aug			0.000	0.992														
21-Aug			*	0.992														
22-Aug			0.000	0.992														
23-Aug			0.000	0.992														
24-Aug			0.000	0.992														
25-Aug			0.001	0.993														
26-Aug			0.005	0.998														
27-Aug			0.002	0.999														
28-Aug			0.001	1.000														
29-Aug			0.000	1.000														
30-Aug			0.000	1.000														

a Regular day off.

Table 4. Kobuk River chum salmon drift test fish CPUE indices, mean CPUE and percent by drift and site, 2001.

Drift Period	Season CPUE Indices	No. of Period Drifts	Season Mean CPUE	Percent	Station	Season CPUE Indices	No. of Site Drifts	Season Mean CPUE	Percent
1 0800 hr.	1,852.0	38	48.7	41.1	N North Bank	912.5	39	23.4	30.1
2 1500 hr.	1,296.8	38	34.1	28.8	S South Bank	2,114.2	39	54.2	69.9
3 2200 hr.	1,357.6	39	34.8	30.1					
Total	4,506.5	115	39.2	100.0		3,026.7	78	38.8	100.0

Table 5. Kobuk River chum salmon drift test fish diurnal and spatial distribution expressed as mean CPUE by drift period and by site, 1993-2001. [a]

Year	Mean CPUE by Drift Period			Yearly Mean CPUE	Percent Mean CPUE by Drift Period			Mean CPUE by Site		Yearly Mean CPUE	Percent Mean CPUE by Site	
	1	2	3		1	2	3	N	S		N	S
1993	13.0	21.3	15.9	16.8	25.4	43.4	31.1	10.0	24.9	17.4	28.7	71.3
1994	25.8	33.2	23.7	27.5	31.7	39.8	28.5	4.9	53.5	29.2	8.4	91.6
1995	29.4	37.6	38.7	35.0	29.6	34.7	35.7	25.2	48.2	36.7	34.3	65.7
1996	73.2	81.7	66.5	73.8	32.4	37.2	30.3	40.7	108.1	74.4	27.3	72.7
1997	23.9	23.3	23.6	23.6	33.1	33.2	33.7	12.7	33.8	23.3	27.3	72.7
1998	18.6	20.1	14.0	17.6	35.9	38.9	25.9	7.4	22.9	15.1	24.4	75.6
1999	49.7	38.6	25.4	38.2	44.4	34.5	21.2	14.3	70.2	42.3	17.0	83.0
2000	43.2	35.2	32.3	36.9	39	31.8	29.1	26.6	47.8	37.2	35.7	64.3
2001	41.1	28.8	30.1	39.2	41.1	28.8	30.1	23.4	54.2	38.8	30.1	69.9

[a] Drift 1 begins at 0800, drift 2 at 1500, drift 3 at 2200 hours. Site N is the North Bank (right bank), Site S is the South Bank (left bank).

Table 6. Kobuk River chum salmon drift test fish CPUE and cumulative CPUE by drift, 1993-2001.

	1993			1994			1995			1996			1997			1998			1999			2000			2001		
Date	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.
5-Jul																									1		
																									2		
																									3	0.00	0.00
6-Jul																									1	2.58	2.58
																									2	2.58	5.16
																									3	2.61	7.77
7-Jul																						1			1	2.38	10.15
																						2	0.00	0.00	2	0.00	10.15
																						3	2.58	2.6	3	4.80	14.95
8-Jul																						1	0.00	2.6	1	2.47	17.42
																						2	0.00	2.6	2	0.00	17.42
																						3	2.55	5.1	3	0.00	17.42
9-Jul										1			1									1	0.00	5.1	1	4.85	22.27
										2	7.7	7.7	2	0.0	0.0							2	0.00	5.1	2	19.20	41.47
										3	17.9	25.5	3	10.7	10.7							3	0.00	5.1	3	7.83	49.30
10-Jul										1	5.2	30.7	1	0.0	10.7	1						1	0.00	5.1	1	2.58	51.88
										2	21.1	51.8	2	0.0	10.7	2						2	5.11	10.2	2	2.58	54.46
										3	19.1	70.9	3	0.0	10.7	3	5.2	5.2				3	0.00	10.2	3	19.20	73.66
11-Jul										1	78.1	149.0	1	0.0	10.7	1	0.0	5.2	1	0.0	0.0	1	0.00	10.2	1	19.01	92.67
										2	103.3	252.3	2	5.3	15.9	2	2.5	7.8	2	0.0	0.0	2	0.00	10.2	2	27.97	120.64
										3	122.1	374.4	3	10.8	26.7	3	0.0	7.8	3	0.0	0.0	3	7.66	17.9	3	12.63	133.27
7 12-Jul	1	15.5	15.5				1	0.0	0.0	1	88.4	462.8	1	0.0	26.7	1	*	7.8	1	0.0	0.0	1	0.00	17.9	1	12.50	145.77
	2	2.5	18.0				2	0.0	0.0	2	32.2	495.0	2	16.0	42.7	2		7.8	2	0.0	0.0	2	2.61	20.5	2	15.16	160.93
	3	16.0	34.0				3	0.0	0.0	3	38.4	533.4	3	5.3	48.1	3		7.8	3	0.0	0.0	3	2.58	23.1	3	10.21	171.14
13-Jul	1	5.4	39.4	1	0.0	0.0	1	0.0	0.0	1	61.9	595.4	1	*	48.1	1	25.0	32.8	1	0.0	0.0	1	0.00	23.1	1	29.09	200.23
	2	15.5	54.9	2	0.0	0.0	2	2.9	2.9	2	97.2	692.6	2		48.1	2	12.8	45.5	2	0.0	0.0	2	2.55	25.6	2	2.58	202.81
	3	25.4	80.3	3	0.0	0.0	3	0.0	2.9	3	66.0	758.6	3		48.1	3	9.9	55.4	3	0.0	0.0	3	2.53	28.2	3	19.39	222.20
14-Jul	1	13.2	93.5	1	0.0	0.0	1	2.8	5.7	1	*	758.6	1	0.0	48.1	1	12.6	68.1	1	0.0	0.0	1	0.00	28.2	1	67.30	289.50
	2	0.0	93.5	2	5.3	5.3	2	5.5	11.2	2		758.6	2	7.9	56.0	2	9.9	78.0	2	0.0	0.0	2	2.61	30.8	2	5.16	294.66
	3	46.1	139.5	3	2.6	7.9	3	0.0	11.2	3		758.6	3	10.8	66.8	3	0.0	78.0	3	0.0	0.0	3	12.63	43.4	3	57.86	352.52
15-Jul	1	20.6	160.1	1	5.0	12.8	1	5.6	16.8	1	100.7	859.2	1	2.8	69.5	1	22.3	100.2	1	0.0	0.0	1	0.00	43.4	1	45.71	398.23
	2	33.9	194.0	2	2.6	15.4	2	0.0	16.8	2	52.9	912.2	2	8.2	77.7	2	12.4	112.6	2	0.0	0.0	2	0.00	43.4	2	45.00	443.23
	3	46.5	240.5	3	0.0	15.4	3	2.8	19.5	3	100.7	1,012.8	3	0.0	77.7	3	7.5	120.1	3	0.0	0.0	3	2.58	46.0	3	24.49	467.72
16-Jul	1	2.7	243.2	1	5.1	20.6	1	*	19.5	1	50.2	1,063.0	1	10.7	88.4	1	18.1	138.2	1	0.0	0.0	1	0.00	46.0	1	48.00	515.72
	2	32.5	275.7	2	10.4	31.0	2		19.5	2	82.3	1,145.3	2	11.3	99.7	2	12.8	150.9	2	0.0	0.0	2	2.58	48.6	2	20.43	536.15
	3	2.7	278.5	3	18.9	49.9	3		19.5	3	85.0	1,230.3	3	20.9	120.5	3	21.3	172.3	3	0.0	0.0	3	7.66	56.2	3	28.51	564.66
17-Jul	1	23.5	302.0	1	*	49.9	1	0.0	19.5	1	93.7	1,323.9	1	21.3	141.9	1	10.0	182.3	1	0.0	0.0	1	0.00	56.2	1	84.83	649.49
	2	28.7	330.7	2		49.9	2	0.0	19.5	2	34.3	1,358.2	2	8.3	150.2	2	5.1	187.3	2	10.0	10.0	2	7.74	64.0	2	42.77	692.26
	3	0.0	330.7	3		49.9	3	0.0	19.5	3	56.7	1,414.9	3	15.7	165.8	3	0.0	187.3	3	2.6	12.6	3	7.58	71.6	3	10.32	702.58
18-Jul	1	*	330.7	1	2.6	52.5	1	2.8	22.3	1	59.2	1,474.1	1	16.0	181.8	1	25.5	212.8	1	25.3	37.8	1	0.00	71.6	1	42.06	744.64
	2		330.7	2	0.0	52.5	2	2.7	25.0	2	98.3	1,572.4	2	10.9	192.7	2	5.1	217.9	2	0.0	37.8	2	7.74	79.3	2	28.24	772.88
	3		330.7	3	16.5	71.0	3	0.0	25.0	3	117.8	1,690.2	3	21.3	214.0	3	25.3	243.2	3	0.0	37.8	3	2.58	81.9	3	40.75	813.63
19-Jul	1	5.5	336.1	1	23.7	94.7	1	0.0	25.0	1	69.8	1,760.1	1	8.1	222.1	1	10.2	253.4	1	2.5	40.4	1	0.00	81.9	1	105.52	919.15
	2	2.7	338.8	2	10.3	105.0	2	12.9	37.9	2	61.2	1,821.2	2	18.7	240.8	2	17.7	271.1	2	5.2	45.5	2	39.18	121.1	2	72.21	991.36
	3	23.5	362.3	3	2.8	107.8	3	16.2	54.1	3	36.9	1,858.2	3	27.3	268.1	3	7.7	278.8	3	9.9	55.4	3	13.04	134.1	3	12.90	1004.26
	1	2.8	365.1	1	2.9	110.6	1	10.8	64.8	1	70.3	1,928.5	1	*	268.1	1	*	278.8	1	2.6	58.0	1	0.00	134.1	1	37.78	1042.04
	2	5.4	370.5	2	8.1	118.7	2	16.4	81.2	2	69.8	1,998.3	2		268.1	2		278.8	2	12.8	70.8	2	32.84	166.9	2	0.00	1042.04
	3	0.0	370.5	3	0.0	118.7	3	21.8	103.0	3	48.7	2,047.0	3		268.1	3		278.8	3	0.0	70.8	3	10.32	177.3	3	36.92	1078.96

(continued)

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	1993			1994			1995			1996			1997			1998			1999			2000			2001		
Date	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.
20-Jul	1	2.8	373.2	1	10.8	129.5	1	39.1	142.2	1	66.7	2,113.7	1	11.0	279.1	1	40.9	319.7	1	15.2	85.9	1	20.4	197.7	1	21.60	1100.6
	2	5.5	378.7	2	11.0	140.6	2	27.0	169.1	2	45.7	2,159.4	2	34.3	313.4	2	12.8	332.4	2	48.5	134.4	2	42.1	239.7	2	15.48	1116.0
	3	1.9	380.6	3	0.0	140.6	3	49.0	218.2	3	47.4	2,206.8	3	8.3	321.7	3	35.0	367.4	3	7.7	142.1	3	20.2	260.0	3	47.59	1163.6
21-Jul	1	2.8	383.4	1	5.5	146.0	1	20.7	238.8	1	27.6	2,234.4	1	8.1	329.8	1	38.3	405.7	1	12.8	154.9	1	25.1	285.1	1	38.79	1202.4
	2	0.0	383.4	2	2.6	148.6	2	24.0	262.8	2	72.3	2,306.7	2	0.0	329.8	2	10.3	416.0	2	2.6	157.4	2	52.0	337.0	2	127.38	1329.8
	3	13.2	396.6	3	2.7	151.3	3	18.9	281.7	3	58.2	2,364.9	3	31.3	361.1	3	33.2	449.2	3	20.4	177.8	3	44.1	381.1	3	141.28	1471.1
22-Jul	1	2.7	399.3	1	24.8	176.1	1	53.1	334.7	1	53.0	2,417.9	1	18.5	379.5	1	15.3	464.6	1	0.0	177.8	1	45.0	426.1	1	42.00	1513.1
	2	26.1	425.4	2	13.5	189.6	2	59.2	394.0	2	142.9	2,560.8	2	10.8	390.3	2	38.3	502.9	2	13.0	190.9	2	2.6	428.7	2	51.00	1564.1
	3	51.6	477.0	3	11.2	200.8	3	37.7	431.7	3	105.3	2,666.0	3	2.8	393.1	3	20.4	523.3	3	5.2	196.1	3	0.0	428.7	3	59.26	1623.3
23-Jul	1	8.2	485.2	1	*	200.8	1	39.1	470.7	1	62.8	2,728.6	1	16.4	409.4	1		523.3	1	35.2	229.3	1	30.3	459.0	1	86.00	1709.3
	2	8.1	493.3	2		200.8	2	36.5	507.2	2	100.3	2,829.1	2	20.1	429.5	2		523.3	2	33.9	263.2	2	7.8	466.9	2	33.33	1742.7
	3	10.9	504.2	3		200.8	3	10.9	518.1	3	122.8	2,951.9	3	31.0	460.5	3		523.3	3	7.7	270.9	3	5.2	472.1	3	44.54	1787.2
24-Jul	1	*	504.2	1	24.3	225.0	1	16.2	534.3	1	30.0	2,981.9	1	13.8	474.3	1	15.3	538.6	1	17.9	288.8	1	40.0	512.1	1	67.50	1854.7
	2		504.2	2	13.5	238.5	2	10.9	545.2	2	157.7	3,139.6	2	24.3	498.6	2	40.4	579.0	2	45.0	333.8	2	2.6	514.7	2	66.00	1920.7
	3		504.2	3	5.4	243.9	3	109.4	654.6	3	16.8	3,156.4	3	26.4	524.9	3	15.7	594.7	3	23.0	356.8	3	25.5	540.2	3	106.11	2026.8
25-Jul	1	10.9	515.1	1	32.7	276.6	1	20.6	675.2	1	113.2	3,269.6	1	21.8	546.7	1	37.9	632.5	1	52.5	409.3	1	30.0	570.2	1	105.23	2132.1
	2	8.1	523.2	2	63.7	340.3	2	35.5	710.6	2	5.2	3,274.9	2	11.0	557.8	2	48.5	681.1	2	7.7	417.0	2	41.2	611.4	2	88.00	2220.1
	3	26.4	549.6	3	44.7	384.9	3	47.4	758.0	3	27.7	3,302.6	3	11.0	568.8	3	69.7	750.7	3	58.1	475.1	3	48.5	659.9	3	86.60	2306.7
26-Jul	1	15.5	565.1	1	21.3	406.3	1	50.2	808.3	1	15.2	3,317.8	1	26.4	595.2	1	35.4	786.1	1	107.7	582.8	1	47.5	707.4	1	125.45	2432.1
	2	8.1	573.1	2	59.4	465.6	2	34.7	842.9	2	19.6	3,337.4	2	15.8	611.0	2	51.7	837.8	2	50.0	632.8	2	27.8	735.2	2	102.13	2534.2
	3	0.0	573.1	3	*	465.6	3	102.9	945.8	3	72.7	3,410.1	3	13.2	624.2	3	15.5	853.3	3	*	632.8	3	49.0	784.2	3	38.05	2572.3
28-Jul	1	11.2	584.3	1	*	465.6	1	39.4	985.2	1	52.0	3,462.1	1	29.3	653.5	1	15.0	868.3	1	*	632.8	1	48.5	832.7	1	74.02	2646.3
	2	16.2	600.5	2	*	465.6	2	88.2	1,073.4	2	83.8	3,545.9	2	28.1	681.6	2	43.4	911.7	2	*	632.8	2	93.3	926.0	2	57.27	2703.6
	3	21.6	622.1	3	57.8	523.5	3	67.9	1,141.3	3	8.3	3,554.2	3	33.9	715.5	3	15.5	927.1	3	*	632.8	3	42.5	968.5	3	37.40	2741.0
29-Jul	1	2.7	624.8	1	34.3	557.7	1	48.8	1,190.0	1	110.0	3,664.2	1	34.3	749.8	1	20.4	947.6	1	*	632.8	1	144.4	1112.9	1	79.04	2820.0
	2	0.0	624.8	2	52.5	610.2	2	8.4	1,198.4	2	77.3	3,741.5	2	33.6	783.4	2	17.9	965.4	2	*	632.8	2	78.5	1191.3	2	51.89	2871.9
	3	0.0	624.8	3	19.3	629.6	3	85.1	1,283.5	3	20.4	3,761.9	3	16.2	799.6	3	5.7	971.1	3	55.0	687.8	3	55.9	1247.3	3	31.20	2903.1
30-Jul	1	0.0	624.8	1	83.1	712.8	1	67.1	1,350.5	1	51.1	3,813.0	1	13.3	812.9	1	40.4	1,011.5	1	37.5	725.3	1	153.1	1400.4	1	81.23	2984.3
	2	0.0	624.8	2	38.5	751.2	2	59.2	1,409.7	2	36.0	3,849.0	2	21.3	834.2	2	25.3	1,036.8	2	80.0	805.3	2	71.6	1471.9	2	7.50	2991.8
	3	2.8	627.5	3	82.0	833.1	3	48.6	1,458.3	3	22.9	3,871.8	3	33.0	867.2	3	10.3	1,047.1	3	30.3	835.6	3	45.7	1517.6	3	0.00	2991.8
31-Jul	1	16.2	643.7	1	*	833.1	1	49.0	1,507.4	1	71.3	3,943.1	1	24.6	891.8	1	*	1,047.1	1	206.6	1042.2	1	125.0	1642.7	1	61.59	3053.4
	2	16.2	659.9	2		833.1	2	20.9	1,528.2	2	120.0	4,063.1	2	30.0	921.8	2		1,047.1	2	13.3	1055.6	2	77.8	1720.5	2	25.88	3079.3
	3	5.4	665.3	3		833.1	3	19.1	1,547.3	3	59.1	4,122.2	3	42.5	964.3	3		1,047.1	3	*	1055.6	3	47.0	1767.5	3	21.82	3101.1
1-Aug	1	*	665.3	1	51.4	884.5	1	61.5	1,608.8	1	122.2	4,244.4	1	55.6	1,019.9	1	43.9	1,091.0	1	47.5	1103.1	1	95.1	1862.7	1	78.58	3179.7
	2		665.3	2	124.7	1,009.2	2	81.0	1,689.8	2	252.2	4,496.6	2	32.0	1,051.9	2	20.4	1,111.4	2	224.0	1327.1	2	108.0	1970.7	2	49.90	3229.6
	3		665.3	3	67.2	1,076.4	3	76.9	1,766.8	3	80.0	4,576.6	3	37.6	1,089.5	3	15.7	1,127.1	3	158.1	1485.1	3	99.8	2070.5	3	54.34	3283.9

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Date	1993			1994			1995			1996			1997			1998			1999			2000			2001		
	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.
2-Aug	1	[b]	665.3	1	27.0	1,103.4	1	45.0	1,811.6	1	120.0	4,696.6	1	20.9	1,110.3	1	43.87	1,170.9	1	50.0	1535.1	1	83.9	2154.4	1	44.27	3328.2
	2	0.0	665.3	2	74.6	1,178.0	2	66.2	1,878.0	2	30.6	4,727.2	2	26.4	1,136.8	2	40.85	1,211.8	2	42.5	1577.6	2	52.8	2207.2	2	2.53	3330.7
	3	13.3	678.6	3	92.8	1,270.8	3	35.5	1,913.4	3	28.5	4,755.7	3	18.9	1,157.6	3		1,211.8	3	32.5	1610.1	3	55.8	2262.9	3	0.00	3330.7
3-Aug	1	42.2	720.8	1	62.3	1,333.1	1	53.7	1,967.1	1	76.7	4,832.3	1	33.9	1,191.5	1	5.11	1,216.9	1	33.2	1643.3	1	63.5	2326.5	1	84.83	3415.6
	2	71.5	792.3	2	93.9	1,427.0	2	74.4	2,041.4	2	60.9	4,893.2	2	36.3	1,227.8	2	15.32	1,232.2	2	[b]	1643.3	2	31.3	2357.8	2	20.43	3436.0
	3	[b]	792.3	3	51.7	1,478.7	3	22.1	2,063.5	3	3.8	4,896.9	3	35.5	1,263.3	3	5.22	1,237.4	3	[b]	1643.3	3	36.1	2393.9	3	17.87	3453.9
4-Aug	1	16.7	809.1	1	124.9	1,603.6	1	45.3	2,108.8	1	52.0	4,948.9	1	29.6	1,292.9	1	0.00	1,237.4	1	[b]	1643.3	1	106.2	2500.1	1	56.22	3510.1
	2	60.0	869.1	2	120.0	1,723.6	2	60.0	2,168.8	2	26.0	4,974.9	2	31.4	1,324.3	2	15.16	1,252.6	2	52.5	1695.8	2	58.8	2558.9	2	15.32	3525.4
	3	51.3	920.3	3	82.4	1,806.0	3	53.8	2,222.6	3	145.0	5,119.9	3	19.3	1,343.6	3	2.61	1,255.2	3	95.5	1791.3	3	61.9	2620.7	3	15.65	3541.1
5-Aug	1	40.9	961.2	1	78.9	1,884.9	1	55.1	2,277.8	1	53.8	5,173.7	1	23.0	1,366.6	1	5.11	1,260.3	1	152.9	1944.2	1	121.2	2741.9	1	45.41	3586.5
	2	191.6	1,152.8	2	14.1	1,899.0	2	38.8	2,316.6	2	40.8	5,214.4	2	30.6	1,397.3	2	5.00	1,265.3	2	135.0	2079.2	2	54.3	2796.3	2	0.00	3586.5
	3	2.7	1,155.5	3	78.3	1,977.3	3	56.7	2,373.3	3	80.0	5,294.4	3	19.1	1,416.4	3	5.22	1,270.5	3	31.0	2110.2	3	55.1	2851.3	3	76.55	3663.0
6-Aug	1	12.8	1,168.3	1	116.1	2,093.5	1	[a]	2,373.3	1	44.1	5,338.5	1	41.9	1,458.2	1	17.87	1,288.4	1	98.0	2208.2	1	27.2	2878.5	1	27.70	3690.7
	2	13.8	1,182.1	2	93.3	2,186.8	2		2,373.3	2	43.3	5,381.8	2	39.6	1,497.8	2	15.65	1,304.0	2	54.4	2262.6	2	44.3	2922.8	2	35.64	3726.4
	3	29.3	1,211.4	3	92.9	2,279.7	3		2,373.3	3	148.0	5,529.8	3	45.7	1,543.5	3	15.65	1,319.7	3	95.5	2359.1	3	45.0	2967.8	3	26.67	3753.0
7-Aug	1	47.5	1,258.9	1	[a]	2,279.7	1	55.8	2,429.1	1	136.3	5,666.1	1	35.1	1,578.6	1	27.79	1,347.5	1	107.2	2466.3	1	55.2	3023.0	1	25.00	3778.0
	2	2.8	1,261.6	2		2,279.7	2	68.1	2,497.2	2	57.6	5,723.7	2	34.7	1,613.4	2	5.22	1,352.7	2	127.4	2593.7	2	37.5	3060.5	2	45.71	3823.7
	3	8.4	1,270.0	3		2,279.7	3	19.8	2,516.9	3	51.8	5,775.4	3	38.1	1,651.4	3	18.26	1,371.0	3	7.8	2601.5	3	18.3	3078.8	3	5.22	3829.0
8-Aug	1	[a]	1,270.0	1	77.7	2,357.3	1	21.6	2,538.5	1	94.6	5,870.0	1	69.0	1,720.5	1	2.52	1,373.5	1	[a]	2601.5	1	128.6	3207.3	1	23.48	3852.4
	2		1,270.0	2	64.8	2,422.1	2	74.4	2,612.9	2	221.8	6,091.8	2	49.9	1,770.3	2	18.26	1,391.7	2	[a]	2601.5	2	89.2	3296.5	2	42.48	3894.9
	3		1,270.0	3	49.7	2,471.8	3	41.7	2,654.6	3	98.8	6,190.6	3	11.4	1,781.8	3	7.83	1,399.6	3	[a]	2601.5	3	60.0	3356.5	3	35.29	3930.2
9-Aug	1	5.5	1,275.5	1	85.2	2,556.9	1	38.9	2,693.5	1	120.0	6,310.6	1	45.5	1,827.2	1	15.32	1,414.9	1	58.1	2659.6	1	56.3	3412.9	1	45.71	3975.9
	2	0.0	1,275.5	2	125.7	2,682.6	2	58.1	2,751.6	2	133.3	6,443.9	2	37.2	1,864.4	2	10.21	1,425.1	2	86.6	2746.2	2	96.4	3509.3	2	15.16	3991.1
	3	0.0	1,275.5	3	74.8	2,757.4	3	114.1	2,865.7	3	66.5	6,510.4	3	94.3	1,958.7	3	5.22	1,430.3	3	20.7	2766.8	3	88.7	3598.0	3	5.22	3996.3
10-Aug	1	0.0	1,275.5	1	9.5	2,766.9	1	73.2	2,938.9	1	32.5	6,542.9	1	[a]	1,958.7	1	0.00	1,430.3	1	60.0	2826.8	1	87.5	3685.4	1	51.89	4048.2
	2	8.1	1,283.6	2	54.9	2,821.8	2	29.6	2,968.5	2	98.6	6,641.5	2		1,958.7	2	50.00	1,480.3	2	59.4	2886.2	2	96.0	3781.4	2	67.03	4115.2
	3	29.3	1,313.0	3	86.0	2,907.8	3	71.3	3,039.8	3	42.6	6,684.1	3		1,958.7	3	7.66	1,488.0	3	15.3	2901.5	3	155.2	3936.6	3	45.28	4160.5
11-Aug	1	11.3	1,324.2	1	105.8	3,013.6	1	56.8	3,096.6	1	[a]	6,684.1	1	43.6	2,002.4	1	2.55	1,490.5	1	125.8	3027.3	1	66.3	4002.9	1	52.84	4213.3
	2	40.4	1,364.7	2	50.7	3,064.3	2	20.9	3,117.5	2		6,684.1	2	32.7	2,035.1	2	17.68	1,508.2	2	20.7	3048.0	2	23.5	4026.4	2	75.00	4288.3
	3	0.0	1,364.7	3	9.4	3,073.7	3	34.3	3,151.8	3		6,684.1	3	56.0	2,091.1	3	10.32	1,518.5	3	20.7	3068.6	3	58.8	4085.2	3	89.77	4378.1
12-Aug	1	11.3	1,376.0	1	17.9	3,091.6	1	31.3	3,183.1	1	123.3	6,807.4	1	36.7	2,127.8	1	7.58	1,526.1	1	99.8	3168.4	1	25.5	4110.7	1	33.27	4411.4
	2	0.0	1,376.0	2	183.2	3,274.8	2	105.5	3,288.5	2	39.1	6,846.5	2	54.0	2,181.8	2	0.00	1,526.1	2	28.4	3196.8	2	15.7	4126.4	2	17.87	4429.3
	3	0.0	1,376.0	3	0.0	3,274.8	3	56.3	3,344.8	3	28.2	6,874.7	3	16.0	2,197.8	3	[b]	1,526.1	3	12.9	3209.7	3	33.19	4159.6	3	83.48	4512.7

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Table 6. (Page 4 of 4)

	1993			1994			1995			1996			1997			1998			1999			2000			2001		
Date	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.	Drift	Daily	Cum.
13-Aug				1	23.5	3,298.3	1 [a]		3,344.8	1	105.2	6,979.9	1	41.1	2,238.9	1 [b]		1,526.1	1	144.5	3354.2	1	7.8	4167.4			
				2	10.0	3,308.3	2		3,344.8	2	136.6	7,116.5	2	55.4	2,294.3	2	0.00	1,526.1	2	5.2	3359.4	2	30.0	4197.4			
				3	3.4	3,311.7	3		3,344.8	3	102.9	7,219.4	3	39.3	2,333.6	3	0.00	1,526.1	3		3359.4	3	5.22	4202.6			
14-Aug				1 [a]		3,311.7	1	8.1	3,352.9	1	77.3	7,296.7	1	35.2	2,368.8							1	7.83	4210.4			
				2		3,311.7	2	54.4	3,407.3	2	197.3	7,493.9	2	13.0	2,381.8												
				3		3,311.7	3	23.5	3,430.8	3	181.5	7,675.4	3														
15-Aug				1	7.0	3,318.7	1	25.5	3,456.2																		
				2	8.1	3,326.8	2	18.5	3,474.7																		
				3	0.0	3,326.8	3	32.0	3,506.7																		
16-Aug				1	3.3	3,330.1	1	22.9	3,529.5																		
				2	33.8	3,363.9	2	45.4	3,574.9																		
				3	11.3	3,375.1																					
17-Aug				1	0.0	3,375.1																					
				2	0.0	3,375.1																					
				3	0.0	3,375.1																					
18-Aug				1	0.0	3,375.1																					
				2	0.0	3,375.1																					
				3	0.0	3,375.1																					
19-Aug				1	8.3	3,383.4																					
				2	0.0	3,383.4																					
				3	3.0	3,386.4																					
20-Aug				1	0.0	3,386.4																					
				2	0.0	3,386.4																					
				3	0.0	3,386.4																					
21-Aug				1 [a]		3,386.4																					
				2		3,386.4																					
				3		3,386.4																					
22-Aug				1	0.0	3,386.4																					
				2	0.0	3,386.4																					
				3	0.0	3,386.4																					
23-Aug				1	0.0	3,386.4																					
				2	0.0	3,386.4																					
				3	0.0	3,386.4																					
24-Aug				1	0.0	3,386.4																					
				2	0.0	3,386.4																					
				3	0.0	3,386.4																					

[a] Regular day off.

[b] No drift conducted because of mechanical problems or bad weather.

Table 7. Kobuk River chum salmon drift test fish catch, age, and sex composition, by stratum, 2001.

			Brood Year and (Age Group)				
			1998 (0.2)	1997 (0.3)	1996 (0.4)	1995 (0.5)	Total
Stratum Dates:		7/6-7/21					
Sampling Dates:		7/6-7/21					
Sample Size:		287					
Male		Percent of Catch	0.0%	10.5%	36.6%	2.8%	49.8%
		Number in Catch	0	30	105	8	143
		Avg. Length(mm)		598	619	622	
Female		Percent of Catch	0.0%	10.5%	38.0%	1.7%	50.2%
		Number in Catch	0	30	109	5	144
		Avg. Length(mm)		585	602	622	
Total		Percent of Catch	0.3%	20.9%	74.6%	4.5%	100.0%
		Number in Catch	0	60	214	13	287
Stratum Dates:		7/22-7/31					
Sampling Dates:		7/22-7/31					
Sample Size:		308					
Male		Percent of Catch	0.3%	16.2%	18.8%	1.0%	36.4%
		Number in Catch	1	50	58	3	112
		Avg. Length(mm)	560	600	629	620	
Female		Percent of Catch	0.6%	19.2%	43.5%	0.3%	63.6%
	7	Number in Catch	2	59	134	1	196
		Avg. Length(mm)	560	584	600	600	
Total		Percent of Catch	1.0%	35.4%	62.3%	1.3%	100.0%
		Number in Catch	0	149	83	0	308
Stratum Dates:		8/1-8/13					
Sampling Dates:		8/1-8/13					
Sample Size:		335					
Male		Percent of Catch	1.8%	21.8%	16.1%	0.9%	40.6%
		Number in Catch	6	73	54	3	136
		Avg. Length(mm)	587	614	616	657	
Female		Percent of Catch	2.7%	30.1%	25.4%	1.2%	59.4%
		Number in Catch	9	101	85	4	199
		Avg. Length(mm)	578	582	595	628	
Total		Percent of Catch	4.5%	51.9%	41.5%	2.1%	100.0%
		Number in Catch	15	174	139	7	335
Stratum Dates:		7/6-8/13					
Sampling Dates:		7/6-8/13		Season Total			
Sample Size:		930					
Male		Percent of Catch	0.8%	16.5%	23.3%	1.5%	42.0%
		Number in Catch	7	153	217	14	391
		Avg. Length(mm)	583	606	621	629	
Female		Percent of Catch	1.2%	20.4%	35.3%	1.1%	58.0%
		Number in Catch	11	190	328	10	539
		Avg. Length(mm)	575	583	599	622	
Total		Percent of Catch	1.9%	36.9%	58.6%	2.6%	100.0%
		Number in Catch	18	343	545	24	930

Table 8. Comparison of chum salmon age, sex, and length composition from the Kotzebue District commercial catch and the Kobuk and Noatak River test fish catches, 2001.

			Brood Year and (Age Group)					
			1998 (0.2)	1997 (0.3)	1996 (0.4)	1995 (0.5)	1994 (0.6)	Total
Stratum Dates:		7/10-8/24						
Sample Size:		3,670			Kotzebue Commercial Catch			
Male		Percent of Sample	1.4%	19.3%	20.2%	1.0%	0.0%	41.9%
		Number in Catch	2,916	40,810	42,769	2,124	19	88,638
		Mean Length (mm) [a]	574	607	633	633	630	
Female		Percent of Sample	1.0%	26.4%	29.7%	1.0%	0.1%	58.1%
		Number in Catch	2092	55,882	62,787	2,097	177	94,060
		Mean Length (mm) [a]	565	585	608	622	588	
Total		Percent of Sample	2.4%	45.7%	49.9%	2.0%	0.1%	100%
		Number in Catch	5,008	96,692	105,556	4,221	196	211,672
Sample Dates:		7/6-8/13						
Sample Size:		913			Kobuk River			
Male		Percent of Catch	0.8%	16.5%	23.3%	1.5%		42.0%
		Number in Catch	7	153	217	14		391
	7.0	Mean Length (mm) [a]	583	606	621	629		
Female		Percent of Catch	1.2%	20.4%	35.3%	1.1%		58.0%
		Number in Catch	11	190	328	10		539
		Mean Length (mm) [a]	575	583	599	622		
Total		Percent of Catch	1.9%	36.9%	58.6%	2.6%		100.0%
		Number in Catch	18	343	545	24		930
Sample Dates:		8/8, 8/15						
Sample Size:		257			Noatak River			
Male		Percent of Catch	1.6%	21.8%	5.1%	0.4%		28.8%
		Number in Catch	4	56	13	1		74
		Mean Length (mm) [a]	567	600	627	655		
Female		Percent of Catch	3.1%	50.6%	16.3%	1.2%		71.2%
		Number in Catch	8	130	42	3		183
		Mean Length (mm) [a]	554	576	602	577		
Total		Percent of Catch	4.7%	72.4%	21.4%	1.6%		100.0%
		Number in Catch	12	186	55	4		257

[a] Fork length, mid-eye to fork-of-tail.

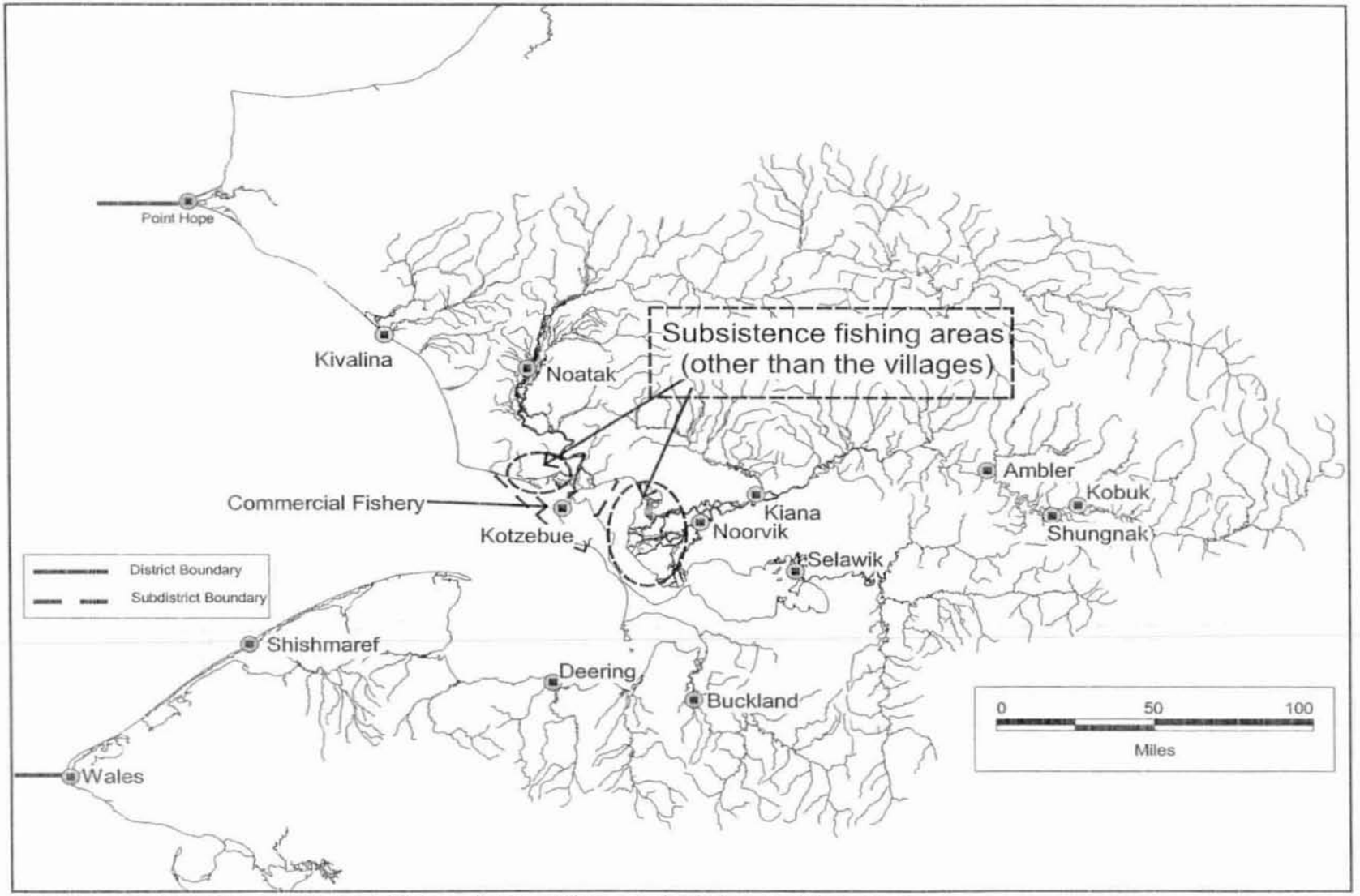

Figure 1. Kotzebue Sound commercial fishing districts, villages and subsistence fishing areas.

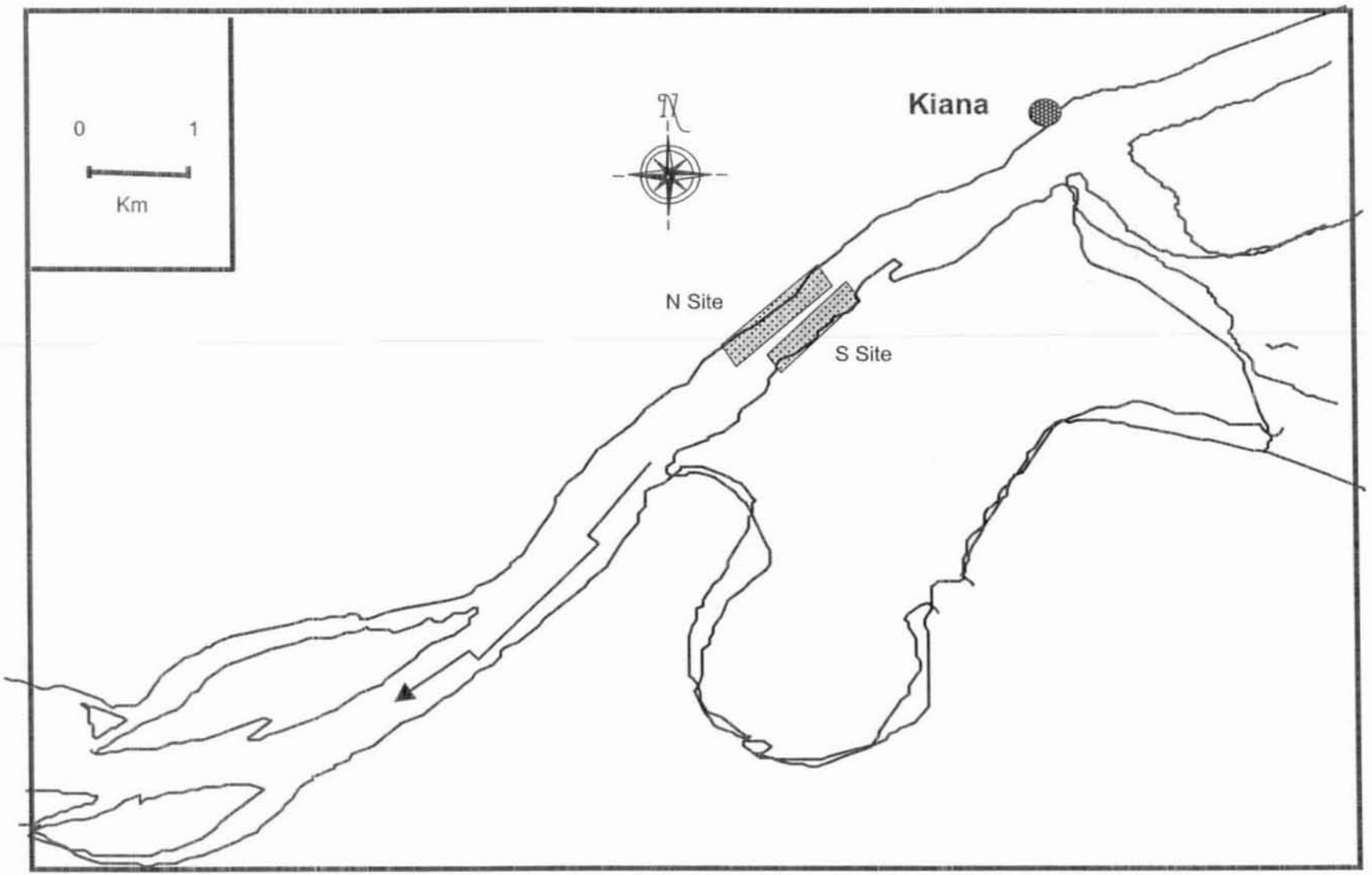

Figure 2. Lower Kobuk River drift test fishing sites.

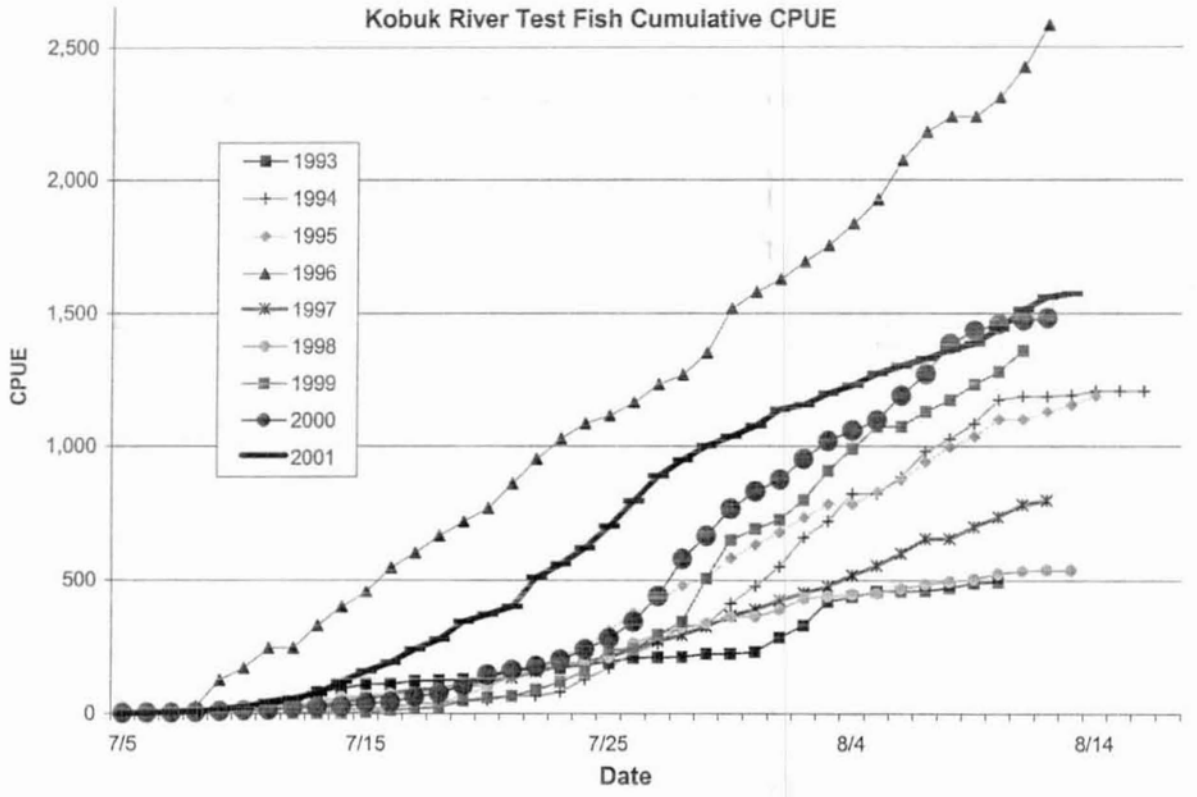

Figure 3. Kobuk River Test Fish Cumulative CPUE 1993-2001.